
Demystifying Carbon Dioxide Removal

January roundup

Dear all,

We are back after a short break over the holidays. The year started strong with the release of the first edition of a new annual report providing a comprehensive stocktake of the current state of CDR. We dive into key findings of the report, including the large gap between what is currently happening and what is needed to meet 1.5°C of warming.

We then turn to the increasing scrutiny of carbon offsets and what this could mean for carbon removals. Some think it might increase demand for verified carbon removals while others see a reason to move away from carbon credits as a whole.

Finally, we take a look at how new funding aims to answer questions about the potential of ocean CDR.

As always, please feel free to share this newsletter with anyone who may be interested. Simply [sign up here](#) and [click here](#) to see an archive of previous editions. If you have any suggestions or feedback, please do get in touch - it's always great to hear from you.

Till next time,

Victoria

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Stat of the month:

0.1%

The [proportion of current CDR deployment that uses novel methods](#), such as direct air capture, enhanced weathering and biochar.



CDR gets its first major assessment

The launch of a new, annual report on the [State of Carbon Dioxide Removal](#) marked a milestone by providing the first comprehensive global assessment of CDR - including taking stock of what carbon removal is currently deployed, what is planned and what is needed to close the 'CDR gap'.

The trailblazing report found that almost all 2 billion tonnes of current CDR comes from land management processes, with only 0.002 billion tonnes or [0.1% of this resulting from novel CDR methods](#), such as technological approaches. If all novel CDR projects currently under development are completed, this amount will increase very slightly to 0.012 billion tonnes by 2025. This is equivalent to [only 2.5 hours of global emissions](#) and would be driven almost entirely by a planned [bioenergy with carbon capture and storage \(BECCS\) project](#) in the US Midwest.

The rate of scale up needed is much larger. The authors estimate that the world will have to remove an additional [0.96 billion tonnes of carbon dioxide by 2030, and 4.8 billion tonnes by 2050 compared to 2020 levels](#). Novel CDR will need to grow by a factor of 30 by 2030 and 1,300 by 2050, making [the next decade "crucial" to the growth of new technologies](#). This will be incredibly challenging, especially as [no countries have short-term plans to scale up novel CDR by 2030](#). Additional policies will also be critical to maintaining the current levels of natural CDR taking place.

In terms of research, the number of papers on CDR is [growing faster than the rate of general climate change literature](#), indicating a strong interest in the area. Surprisingly, research on biochar makes up [almost 40% of all CDR research](#), while BECCS and Direct Air Capture receive comparatively little attention despite the media hype. Overall, research still needs to be improved, especially site-specific research. The report also found that while [public awareness of CDR is low](#), it is becoming more of a talking point.



"As companies increasingly come under fire for offsets, it is critical to draw "clear distinctions between cheap avoidance offsets vs high quality, durable carbon removal credits", says Jason Hochman"

The report also highlighted how the USD 4 billion of global public investment for CDR was overshadowed by the [USD 3.5 billion US DAC programme](#). Private investment in new technologies was around [USD 200 million](#) between 2020 and 2022 - which pales in comparison to the [USD 366 billion that went to renewables](#) in 2021, or the [USD 1.1 trillion that went towards the low-carbon transition](#) in 2022. However, [investment in climate tech has been growing quickly](#) and, [as one of the few sectors not feeling the pinch of the recession](#), the outlook for investment in 2023 is optimistic.

Overall, the authors want to see [a push for domestic and international CDR policy, transparency and inclusion in nationally determined contributions and global stocktake, as well as public and private funding](#), as with renewables in the past - while [unlikely](#), they do not discount the possibility of a similar level of scale up. Importantly, the report highlights that while large levels of novel CDR are included in the majority of scenarios, it is [highly uncertain if we can sustainably scale up various CDR methods](#). Our best bet at keeping warming to 1.5 degrees is limiting future reliance on CDR by actively reducing emissions and avoiding carbon lock-in now.



From junk offsets to verified removals

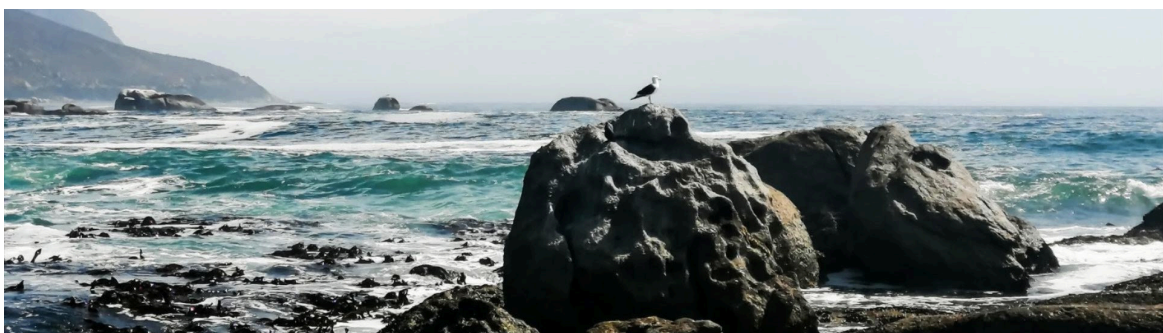
Carbon offsets are under increasing scrutiny. Following an investigation into carbon credits issued by Verra, journalists found that [over 90% of rainforest offsets did not result in emissions reductions](#). The investigation is the latest of a slew of examples highlighting that the majority of credits in the voluntary carbon market are ineffective, and in some cases [causing harm to local communities](#). Purchasing of credits by firms decreased [4% in 2022 from 2021 levels](#), with the main reason being [fear of greenwashing from buying junk credits](#). Retirements of renewable energy and forestry credits [also declined in two consecutive quarters](#) for the first time in voluntary carbon market history.

As companies increasingly come under fire for offsets, it is critical to draw “[clear distinctions between cheap avoidance offsets vs high quality, durable carbon removal credits](#)”, says Jason Hochman, Co-founder and Senior Director of the DAC Coalition. Bloomberg also [highlights this distinction](#) in an article calling for greater investment in carbon removal.

It is possible that companies will [move towards purchasing verified higher-quality carbon removal credits](#), rather than avoidance credits [which made up over three-quarters of sales in 2021](#). In its report on 2022 trends and insights on the voluntary carbon market, Shell found [52% of companies expect removal credits to dominate their portfolio by 2030](#). [Growing awareness of CDR technologies](#) has also been cited as an indication that businesses are feeling under pressure to look for solutions beyond traditional offsets.

Climeworks also believes that more accountability will build trust in CDR, and demonstrated this by [delivering the direct air capture industry's first third-party certified CDR service to corporate customers](#). Stacy Kauk, Shopify head of Sustainability, said it was an “[important inflection point in the development of direct air capture](#)”, moving DAC from “science fiction” to “reality”.

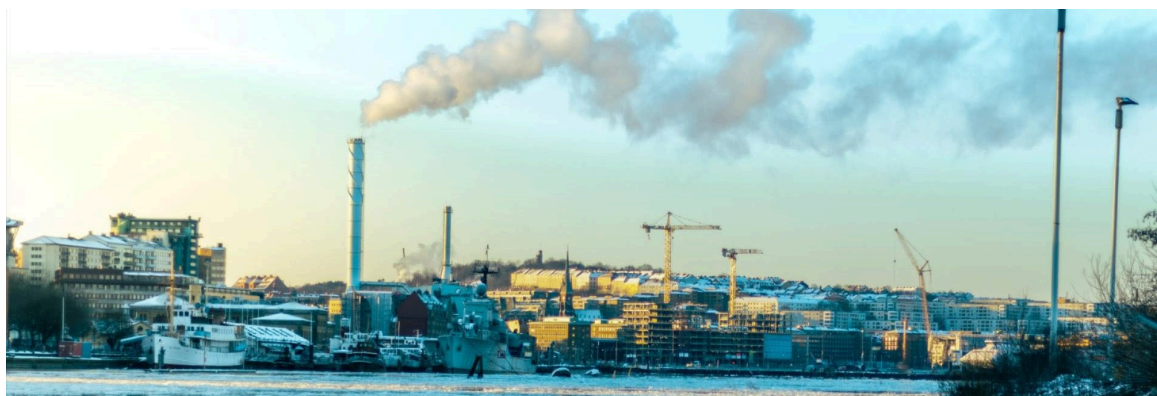
Additionally, a group of scientists have proposed a slightly different alternative to the current model of offsetting - a “[carbon takeback obligation](#)”. Under this model, all fossil fuels extracted or imported into a country would [have to be offset by storing the equivalent amount of emissions generated by the fuel underground as carbon dioxide](#). This approach implements the extended producer responsibility, meaning that it would be on oil, gas and coal producers to foot the bill. The [authors claim this could be a way to meet climate goals at an affordable cost while maintaining energy security](#).



Ocean CDR in motion

Trials are in the works for a carbon removal method known as ocean alkalinity enhancement (OAE). The approach, which involves dissolving alkaline substances into the ocean to take up carbon and make the water less acidic, has never been tested at scale, [but funding is now going towards research](#). Working with [Ocean Visions](#), [Additional Ventures](#) has put aside USD 100 million for OAE research and development, and the [US government is also accepting grant applications for research](#).

While the process is the [acceleration of a natural cycle](#), there are some concerns about any potential unintended impacts to ecosystems, the energy needed to mine and distribute the minerals used, and how to effectively monitor carbon uptake. A key focus of the programme is to understand how OAE could be done safely and effectively, and will keep a close eye on the social impact of potential projects. Potential projects will [gain permission from authorities, engage local stakeholders and stick to codes of conduct](#) for research on climate interventions.



News in brief

[Guest post: The state of 'carbon dioxide removal' in seven charts](#) (Carbon Brief)

“Taking CO₂ out of the air – a practice known as carbon dioxide removal (CDR) – is increasingly recognised as a crucial part of achieving climate goals, alongside rapidly reducing emissions.”

[Adnoc to pilot project that converts carbon dioxide into rocks](#) (The National)

“[Adnoc](#) will undertake a pilot project with British-Omani sustainability company 44.01 to permanently convert carbon dioxide from the air into a mineral within rock formations in Fujairah.”

[Greenpeace accuses Treasury of distorting its stance on biomass burning](#) (The Guardian)

“Greenpeace has accused the government of misrepresenting its stance on burning trees for electricity, giving a minister the impression of public support for the highly controversial practice in meetings with the power company Drax.”

[The Houston Texans' plan to offset its pollution is backed by Big Oil and Gas](#) (The Verge)

"The Houston Texans, the NFL team reppin' the city that's arguably the oil and gas capital of the world, says it wants to go green. So of course the team is working with an oil and gas giant to try to tackle climate change."

[Invoking The Engineering Ambition Of The Past To Create A Carbon Dioxide Removal Industry For The Future](#) (Forbes)

"When it comes to achieving net zero, much of the work done so far has revolved around cutting the amount of carbon dioxide (CO₂) we pump into the atmosphere. While these efforts are to be welcomed, reducing our collective dependency on fossil fuels, improving energy efficiency and investing in renewables can only go so far."

[This startup captures CO₂ by injecting it straight into volcanic rock](#) (Fast Company)

"In a remote, barren part of northern Kenya, a new pilot project will soon begin injecting CO₂ more than 1,300 feet underground into volcanic rocks, where the greenhouse gas will also turn to stone."

[Direct air carbon capture sets up shop in the oilfields of Texas](#) (Oil and Gas Watch)

"A subsidiary of Occidental Petroleum is planning to build the world's largest plant designed to capture carbon dioxide (CO₂) directly from the air in the oil and gas fields of West Texas, with a startup date sometime in 2024."



Useful resources this month

[Review](#): CDR.fyi's first-ever year in review, breaking down the 592,969 tonnes of carbon removals purchased in 2022.

[Opinion](#): Ugbaad Kosar, Director of environmental justice at Carbon180, thinks carbon removal is no longer a question of "do we need it?" but "how and where?".

[Interview](#): Former Tesla Director Douglas Chan speaks about what Climeworks have in store as their new chief operations officer.

[Study](#): New research finds natural methane emissions from coastal ecosystems may counterbalance up to 57% of carbon uptake.

[Outlook](#): Climeworks discusses how the year ahead could shape the carbon removal industry.

[Report](#): A summary of DAC released as part of a series on different CDR methods.

[Paper](#): A new study finds that while soil organic carbon is important for sustainable farming, carbon certificates fall short of expectations for climate change mitigation.

[Brief](#): An assessment of how the European Commission's proposal for a Framework for Carbon Removals Certification applies to climate-friendly soil management.

[Video](#): Bloomberg assesses if CDR is ready for its big moment.

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Each month the demystifying carbon dioxide removal newsletter digs into the world of CDR to bring you the latest stories on everything from carbon credits and net-zero plans to nature-based solutions (NbS) and new technologies. Feel free to forward this email to your colleagues!

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